PATENT
Attorney Docket No.: PD-N970636A
Customer No.: 020991

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Examiner: W. Benson
DOUGLAS M. DILLON, ET AL.	Group Art Unit: 2153
Appln. No.: Unassigned (Divisional of Appln. No. 09/233,343 filed January 19, 1999)	
Filed: December 7, 2001	
For: METHOD AND APPARATUS FOR SELECTIVELY ALLOCATING AND ENFORCING BANDWIDTH USAGE REQUIREMENTS ON NETWORK USERS	December 7, 2001

BOX PATENT APPLICATION
Commissioner for Patents
Washington, DC 20231

PRELIMINARY AMENDMENT

Sir:

Prior to examination on the merits, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Please amend the specification as follows. A marked-up version of the specification amendments is attached.

Please substitute the paragraph starting at page 1, line 2 and ending at page 1, line 6. A marked-up copy of this paragraph, showing the changes made thereto is attached.

This application is a division of Application No. 09/233,343 filed January 19, 1999, which claims benefit of U.S. Provisional Application No. 60/106,933 filed November 3, 1998.

Please substitute the following paragraph for the paragraph starting at page 33, line 1 and ending at page 33, line 12. A marked-up copy of this paragraph, showing the changes made thereto is attached.

Although only one hybrid terminal 110 is shown in Fig. 1, the invention can include a plurality of hybrid terminals 110. Preferably, all packets sent from all hybrid terminals 110 pass through the hybrid gateway 150 to get untunneled and have their advertized window size changed, if necessary. Thus, the hybrid gateway 150 is a potential system bottleneck. Because of this potential bottleneck, the functions of the hybrid gateway 150 are as simple as possible and are performed as quickly as possible. The hybrid gateway 150 has good Internet connectivity to minimize the accumulated delay caused by packets waiting to be processed by the hybrid gateway 150. The hybrid gateway 150 further performs the function of throttling data flow based on subscriber service level and subscriber time-averaged throughput. Throttling is accomplished by the following.

Please substitute the following paragraph for the paragraph starting at page 40, line 6 and ending at page 40, line 16. A marked-up copy of this paragraph, showing the changes made thereto is attached.

In other embodiments of the present invention, historical usage patterns may be used to exempt users from having their bandwidth throttled. This feature is intended to ensure that historically low data throughput users can get high data throughput volumes on a periodic basis, while historically high data throughput users are throttled when they abuse system resources. Historical usage patterns for a number of days may be generated once per day. For example, a user's historical usage over the past "N" (e.g., 30 or 60) days will be generated and compared to a user's service plan to determine if the user should be in an exempt plan for low-usage users or a non-exempt plan for high-usage users. In an exempt plan, a user may be throttled.

Please substitute the following paragraph for the paragraph starting at page 43, line 2 and ending at page 43, line 9. A marked-up copy of this paragraph, showing the changes made thereto is attached.

Preferably, the satellite gateway 160 is on a same physical network as the hybrid gateway 150. As shown in step 920 of Fig. 9, when a router on the same physical network as the satellite gateway 160 and the hybrid gateway 150 sends out an ARP for the IP address of the satellite interface 120 (to find a physical address of the satellite interface 120), the hybrid gateway 150 responds and says "send it to me." The hybrid gateway 150 needs to intercept packets intended for the satellite interface 120 because it needs to encapsulate packets for the satellite gateway 160 as follows.

IN THE CLAIMS:

Please cancel Claim 1 without prejudice to or disclaimer of the subject matter recited therein.

Please add new Claims 2 through 58 to read as follows.

--2. A method comprising prioritizing transport level packets for transmission wherein at least one of the following conditions is satisfied:

(a) transport level packets containing real time traffic are assigned a higher priority for transmission than transport level packets containing broadcast traffic;

(b) transport level packets containing broadcast traffic are assigned a higher priority for transmission than transport level packets containing interactive TCP traffic;

(c) transport level packets containing interactive TCP traffic are assigned a higher priority for transmission than transport level packets containing bulk TCP traffic; and

(d) transport level packets that are UDP packets are assigned a higher priority for transmission than transport level packets containing bulk TCP traffic.

3. A method according to Claim 2, wherein condition (a) is satisfied.

4. A method according to Claim 2, wherein condition (b) is satisfied.

5. A method according to Claim 2, wherein condition (c) is satisfied.

6. A method according to Claim 2, wherein condition (d) is satisfied.

7. A method according to Claim 2, wherein any two of conditions (a) through (d) are satisfied.

8. A method according to Claim 2, wherein all of conditions (a) through (d) are satisfied.

9. An apparatus comprising:

a packet prioritizer that is configured to prioritize transport level packets for transmission wherein at least one of the following conditions is satisfied:

(a) transport level packets containing real time traffic are assigned a higher priority for transmission than transport level packets containing broadcast traffic;

(b) transport level packets containing broadcast traffic are assigned a higher priority for transmission than transport level packets containing interactive TCP traffic;

(c) transport level packets containing interactive TCP traffic are assigned a higher priority for transmission than transport level packets containing bulk TCP traffic; and

(d) transport level packets that are UDP packets are assigned a higher priority for transmission than transport level packets containing bulk TCP traffic.

10. An apparatus according to Claim 9, wherein condition (a) is satisfied.

11. An apparatus according to Claim 9, wherein condition (b) is satisfied.

12. An apparatus according to Claim 9, wherein condition (c) is satisfied.

13. An apparatus according to Claim 9, wherein condition (d) is satisfied.

14. An apparatus according to Claim 9, wherein any two of conditions (a) through (d) are satisfied.

15. An apparatus according to Claim 9, wherein all of conditions (a) through (d) are satisfied.

16. Computer executable code that is configured to effect a method comprising a step of prioritizing transport level packets for transmission so that UDP packets are given a higher priority for transmission than TCP packets.

17. A gateway for use in a system wherein a source apparatus, said gateway, and a destination apparatus are coupled to a TCP/IP network, said gateway comprising:

a packet receiving unit that is configured to receive a packet addressed at the IP level from the destination apparatus to the source apparatus; and

a transport level window size controlling unit that is configured to control the transport level window size of the packet received by said packet receiving unit in accordance with bandwidth usage associated with the destination apparatus.

18. A gateway according to Claim 17, wherein the bandwidth usage is measured as an amount of data sent to the destination apparatus per unit of time.

19. A gateway according to Claim 18, wherein the unit of time is a 24 hour period.

20. A gateway according to Claim 18, wherein the unit of time is a plurality of 24 hour periods.

21. A gateway according to Claim 17, wherein the bandwidth usage is expressed as an average throughput.

22. A gateway according to Claim 17, wherein the bandwidth usage is determined using a leaky bucket analysis.

23. A gateway for use in a system wherein a source apparatus, said gateway, and a destination apparatus are coupled to a TCP/IP network, said gateway comprising:

a throughput controlling unit that is configured to control throughput of data sent from the source apparatus to the destination apparatus through the TCP/IP network in accordance with a number of TCP connections that are open.

24. A gateway for use in a system wherein a source apparatus, said gateway, and a destination apparatus are coupled to a TCP/IP network, said gateway comprising:

a throughput controlling unit that is configured to control throughput of data sent from the source apparatus to the destination apparatus through the TCP/IP network in accordance with a leaky bucket analysis of a user's throughput.

25. An apparatus for use in a system wherein said apparatus, a terminal, and an application server are coupled to a network, said apparatus comprising:

a packet receiving unit that is configured to receive a packet addressed at the IP level from the terminal to the application server; and

a transport level window size controller that is configured to control the transport level window size of the packet in accordance with the source IP address of the packet received by said packet receiving unit.

26. An apparatus according to Claim 25, wherein said transport level window size controller controls the transport level window size of the packet in accordance with the source IP address of the packet by reducing the transport level window size in response to bandwidth usage associated with the source IP address exceeding a threshold.

27. A method comprising:

receiving by a gateway for use in a system wherein a source apparatus, the gateway, and a destination apparatus are coupled to a TCP/IP network, of a packet addressed at the IP level from the destination apparatus to the source apparatus; and

controlling by the gateway of the transport level window size of the packet received in said receiving step in accordance with bandwidth usage associated with the destination apparatus.

28. A method according to Claim 27, wherein the bandwidth usage is measured as an amount of data sent to the destination apparatus per unit of time.

29. A method according to Claim 28, wherein the unit of time is a 24 hour period.

30. A method according to Claim 28, wherein the unit of time is a plurality of 24 hour periods.

31. A method according to Claim 27, wherein the bandwidth usage is expressed as an average throughput.

32. A method according to Claim 27, wherein the bandwidth usage is determined using a leaky bucket analysis.

33. A method comprising:

controlling by a gateway for use in a system wherein a source apparatus, the gateway, and a destination apparatus are coupled to a TCP/IP network, of throughput of data sent from the source apparatus to the destination apparatus through the TCP/IP network in accordance with a number of TCP connections that are open.

34. A method comprising:

controlling by a gateway for use in a system wherein a source apparatus, the gateway, and a destination apparatus are coupled to a TCP/IP network, of throughput of data sent from the source apparatus to the destination apparatus through the TCP/IP network in accordance with a leaky bucket analysis of a user's throughput.

35. A method comprising:

receiving by an apparatus on a network to which the apparatus, a terminal, and an application server are coupled of a packet addressed at the IP level from the terminal to the application server; and

controlling the transport level window size of the packet received in said receiving step in accordance with the source IP address of the packet.

36. A method according to Claim 35, wherein said controlling step controls the transport level window size of the packet in accordance with the source IP address of the packet by reducing the transport level window size in response to bandwidth usage associated with the source IP address exceeding a threshold.

37. A gateway according to Claim 18, wherein the unit of time is a 24 hour period.

38. A gateway for use in a system wherein a source apparatus, said gateway, and a destination apparatus are coupled to a TCP/IP network, said gateway comprising:

a throughput controlling unit that is configured to control throughput of data sent from the source apparatus to the destination apparatus through the TCP/IP network in accordance with a leaky bucket analysis of the throughput.

39. A method comprising:

controlling by a gateway for use in a system wherein a source apparatus, the gateway, and a destination apparatus are coupled to a TCP/IP network, of throughput of data sent from the source apparatus to the destination apparatus through the TCP/IP network in accordance with a leaky bucket analysis of the throughput.

40. An apparatus comprising:

packet prioritizing means for prioritizing transport level packets for transmission wherein at least one of the following conditions is satisfied:

(a) transport level packets containing real time traffic are assigned a higher priority for transmission than transport level packets containing broadcast traffic;

(b) transport level packets containing broadcast traffic are assigned a higher priority for transmission than transport level packets containing interactive TCP traffic;

(c) transport level packets containing interactive TCP traffic are assigned a higher priority for transmission than transport level packets containing bulk TCP traffic; and

(d) transport level packets that are UDP packets are assigned a higher priority for transmission than transport level packets containing bulk TCP traffic.

41. An apparatus according to Claim 40, wherein condition (a) is satisfied.

42. An apparatus according to Claim 40, wherein condition (b) is satisfied.

43. An apparatus according to Claim 40, wherein condition (c) is satisfied.

44. An apparatus according to Claim 40, wherein condition (d) is satisfied.

45. An apparatus according to Claim 40, wherein any two of conditions (a) through (d) are satisfied.

46. An apparatus according to Claim 40, wherein all of conditions (a) through (d) are satisfied.

47. A gateway for use in a system wherein a source apparatus, said gateway, and a destination apparatus are coupled to a TCP/IP network, said gateway comprising:

packet receiving means for receiving a packet addressed at the IP level from the destination apparatus to the source apparatus; and

transport level window size controlling means for controlling the transport level window size of the packet received by said packet receiving means in accordance with bandwidth usage associated with the destination apparatus.

48. A gateway according to Claim 47, wherein the bandwidth usage is measured as an amount of data sent to the destination apparatus per unit of time.

49. A gateway according to Claim 48, wherein the unit of time is a 24 hour period.

50. A gateway according to Claim 48, wherein the unit of time is a plurality of 24 hour periods.

51. A gateway according to Claim 47, wherein the bandwidth usage is expressed as an average throughput.

52. A gateway according to Claim 47, wherein the bandwidth usage is determined using a leaky bucket analysis.

53. A gateway for use in a system wherein a source apparatus, said gateway, and a destination apparatus are coupled to a TCP/IP network, said gateway comprising:

throughput controlling means for controlling throughput of data sent from the source apparatus to the destination apparatus through the TCP/IP network in accordance with a number of TCP connections that are open.

54. A gateway for use in a system wherein a source apparatus, said gateway, and a destination apparatus are coupled to a TCP/IP network, said gateway comprising:

throughput controlling means for controlling throughput of data sent from the source apparatus to the destination apparatus through the TCP/IP network in accordance with a leaky bucket analysis of a user's throughput.

55. An apparatus for use in a system wherein said apparatus, a terminal, and an application server are coupled to a network, said apparatus comprising:

packet receiving means for receiving a packet addressed at the IP level from the terminal to the application server; and

transport level window size controlling means for controlling the transport level window size of the packet in accordance with the source IP address of the packet received by said packet receiving unit.

56. An apparatus according to Claim 55, wherein said transport level window size controlling means controls the transport level window size of the packet in accordance with the source IP address of the packet by reducing the transport level window size in response to bandwidth usage associated with the source IP address exceeding a threshold.

57. A gateway according to Claim 48, wherein the unit of time is a 24 hour period.

58. A gateway for use in a system wherein a source apparatus, said gateway, and a destination apparatus are coupled to a TCP/IP network, said gateway comprising:

throughput controlling means for controlling throughput of data sent from the source apparatus to the destination apparatus through the TCP/IP network in accordance with a leaky bucket analysis of the throughput.--.

REMARKS

Claims 2 through 58 are pending, with Claims 2, 9, 16, 17, 23, 24, 25, 27, 33, 34, 35, 38, 39, 40, 47, 53, 54, 55, and 58 being independent. Claim 1 has been cancelled without prejudice. Claims 2 through 58 have been added.

REQUEST FOR INTERVIEW

If any questions remain, Applicants respectfully request that the Examiner contact Applicants' undersigned representative, John T. Whelan, at (301) 428-7172.

CONCLUSION

Applicants submit that this application is in condition for allowance, and a Notice of Allowance is respectfully requested.

Applicants' undersigned attorney may be reached at (301) 428-7172. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

12/07/01

John T. Whelan
Attorney for Applicants
Registration No. 32,448

HUGHES ELECTRONICS CORPORATION
Bldg. 001, M/S-A109
P.O. Box 956
El Segundo, CA 90245-0956
(301) 428-7172

DSG\llp

DC_MAIN 74617 v 1

10010524 . 120701

VERSION SHOWING CHANGES TO THE SPECIFICATION

Please substitute the following paragraph for the paragraph starting at page 1, line 2 and ending at page 1, line 6.

[This application is a continuation-in-part of U.S. application serial no. 08/804,314 (attorney docket no. PD-N94026A), filed February 22, 1997, which is a divisional of U.S. application serial no. 08/257,670, filed June 8, 1994. This application claims priority from provisional application serial no. 60/106,933 filed November 3, 1998.]

This application is a division of Application No. 09/233,343 filed January 19, 1999, which claims benefit of U.S. Provisional Application No. 60/106,933 filed November 3, 1998.

Please substitute the following paragraph for the paragraph starting at page 33, line 1 and ending at page 33, line 12.

Although only one hybrid terminal 110 is shown in Fig. 1, the invention can include a plurality of hybrid terminals 110. Preferably, all packets sent from all hybrid terminals 110 pass through the hybrid gateway 150 to get untunneled and have their advertized window size changed, if necessary. Thus, the hybrid gateway 150 is a potential system bottleneck. Because of this potential bottleneck, the functions of the

hybrid gateway 150 are as simple as possible and are performed as quickly as possible. The hybrid gateway 150 has good Internet connectivity to minimize the accumulated delay caused by packets waiting to be processed by the hybrid gateway 150. The hybrid gateway 150 further performs the function of throttling data flow based on subscriber service level and subscriber time-averaged throughput. Throttling is accomplished by the following.

Please substitute the following paragraph for the paragraph starting at page 40, line 6 and ending at page 40, line 16.

In other embodiments of the present invention, historical usage patterns may be used to exempt users from having their bandwidth throttled. This feature is intended to ensure that historically low data throughput users can get high data throughput volumes on a periodic basis, while historically high data throughput users are throttled when they abuse system resources. Historical usage patterns for a number of days may be generated once per day. For example, a user's historical usage over the past "N" (e.g., 30 or 60) days will be generated and compared to a user's service plan to determine if the user should be in an exempt plan for low-usage users or a non-exempt plan for high-usage users. In an exempt plan, a user may be throttled.

Please substitute the following paragraph for the paragraph starting at page 43, line 2 and ending at page 43, line 9.

Preferably, the satellite gateway 160 is on a same physical network as the hybrid gateway 150. As shown in step 920 of Fig. 9, when a router on the same physical network as the satellite gateway 160 and the hybrid gateway 150 sends out an ARP for the IP address of the satellite [gateway 160] interface 120 (to find a physical address of the satellite [gateway 160] interface 120), the hybrid gateway 150 responds and says "send it to me." The hybrid gateway 150 needs to intercept packets intended for the satellite [gateway 160] interface 120 because it needs to encapsulate packets for the satellite gateway 160 as follows.

10010521.120701

DC_MAIN 76762 v 1